In the Claims

1. (Currently amended) Apparatus for detecting charged particles, the apparatus comprising a chamber for receiving said particles and being such that, in use, at least a partial vacuum is maintained in the chamber; an impact responsive sensor for detecting particles incident thereon, at least the part of the sensor on which the particles are incident being situated in the chamber; an accelerating ~~means~~ electrode for providing, in the chamber, an electric field for accelerating charged particles therein towards the sensor and an electrically conductive barrier ~~means~~ sealing an inlet to the chamber to allow said partial vacuum to be maintained, the barrier means being sufficiently thin to enable the charged particles to be detected to travel therethrough, and being electrically isolated from the accelerating ~~means~~ electrode so as to be capable of being maintained at a different potential from the latter.

2. (Currently amended) Apparatus according to claim 1, in which the accelerating ~~means~~ electrode comprises an electrically conductive member situated on or adjacent to the sensor, and a connector for connecting said member to an accelerating voltage.

3. (Previously presented) Apparatus according to claim 1, in which the sensor comprises a scintillator for emitting light in response to the impact of a charged particle therewith.

4. (Currently amended) Apparatus according to claim 3, in which the accelerating ~~means~~ electrode comprises an electrically conductive member situated on or adjacent to the sensor, and a connector for connecting said member to an accelerating voltage, and in which the scintillator incorporates said ~~electrically conductive member~~ accelerating electrode.

5. (Previously presented) Apparatus according to claim 4, in which the sensor comprises an Everhart-Thornley detector.

6. (Currently amended) Apparatus according to claim 1, in which the barrier ~~means~~ comprises a membrane of metallic foil.

7. (Original) Apparatus according to claim 6, in which the foil is of aluminium.

8. (Original) Apparatus according to claim 7, in which the aluminium foil is of a thickness of 7.5nm.

9. (Currently amended) Apparatus according to any of claims 6 to 8 claim 6, in which the barrier ~~means~~ further comprises a support ~~means~~ which extends across said inlet behind the foil to support the latter against pressure exerted on the membrane by gas outside the chamber.

10. (Currently amended) Apparatus according to claim 1, in which the apparatus further includes an electrically conductive cage mounted in front of, but electrically insulated from, the barrier ~~means~~, the cage being connectable to an accelerating voltage for drawing particles towards the barrier ~~means~~, the cage being so constructed as to allow the passage of particles therethrough.

11. (Previously presented) Apparatus according to claim 1, in which the apparatus includes a pump connected to, and operable to evacuate, the chamber.

12. (Currently amended) Apparatus according to claim 2, in which the apparatus includes a voltage ~~application means~~ source for applying a first accelerating voltage to said ~~electrically conductive member~~ accelerating electrode and a second accelerating voltage of the same polarity as, but lower than, the first accelerating voltage, to the barrier ~~means~~.

13. (Currently amended) Apparatus according to claim 12, in which the apparatus further includes an electrically conductive cage mounted in front of, but electrically insulated from, the barrier ~~means~~, the cage being connectable to an accelerating voltage for drawing particles towards the barrier means, the cage being so constructed as to allow the passage of particles therethrough, and in which the voltage ~~application means~~ source is also operable to apply to the cage a further voltage, of the same polarity as, but lower than, the second voltage.

14. (Original) Apparatus according to claim 10, in which the cage is part-spherical or ellipsoidal.

15. (Currently amended) A scanning electron microscope having a sample chamber for holding a sample to be imaged in a gaseous environment, ~~generating means~~ an electron beam generator for generating a scanning beam of electrons and directing said beam onto a sample in said sample chamber, wherein said chamber also contains ~~detecting means~~ a detector for detecting secondary electrons emitted by the sample, said ~~detecting means~~ detector comprising apparatus according to claim 1.

16. (Currently amended) A microscope according to claim 15, in which the accelerating ~~means~~ electrode comprises an electrically conductive member situated on or adjacent to the sensor, and a connector for connecting said member to an accelerating voltage, wherein the electrically conductive member and barrier means are connected to a voltage ~~application means~~ source for applying a voltage of +10 kV to the member and of 0 to +1 kV to the barrier means.

17. (Currently amended) A method of detecting charged particles in a gaseous environment, the method comprising the steps of allowing or causing said particles to pass through an electrically conductive barrier ~~means~~ at the inlet to a chamber in

which at least part of an impact responsive sensor is situated; accelerating particles in the chamber towards the sensor, by means of an electric field in the chamber, while maintaining the chamber at a lower pressure than said environment and maintaining the barrier ~~means of~~ at a potential that at least reduces the intensity of electric field passing through the barrier means and into the environment, wherein the barrier means allows the passage of said particles whilst enabling the lower pressure to be maintained in the chamber.

18. (Previously presented) A method according to claim 17, wherein the step of maintaining a lower pressure in the chamber is achieved by maintaining at least a partial vacuum in the chamber by means of a pump connected to an outlet of the chamber.

19. (Currently amended) A method according to claim 17, further comprising the step of maintaining the barrier ~~means~~ at a different potential from that of an accelerating ~~means~~ electrode, for creating said electric field in the chamber.

20. (New) An electron detector comprising:

a chamber having an inlet opening for particles to enter the chamber from an environment to which the inlet opening is directed, said inlet opening being at a first electrical potential,

a sensor responsive to electrons incident thereon, said sensor being at least partially situated in said chamber,

an accelerating electrode situated in said chamber,

a voltage supply connected to said accelerating electrode and supplying a second potential to said accelerating electrode that is higher than said first potential, and

a vacuum pump connected to said chamber, wherein said vacuum pump maintains a partial vacuum inside said chamber which is higher than a partial vacuum in said environment to which said inlet opening is directed.